

Claims

1. A method of providing a reliable server function in support of a service or a set of services, such as internet-based applications, the method comprising the following steps:
- forming a server pool (SP) with one or more pool elements (PE1, PE2), each of the pool elements (PE1, PE2) being capable of supporting the service/s,
 - providing at least one name server (NS) for managing and maintaining a name space for the server pool (SP), the name space comprising a pool name identifying the server pool (SP),
 - sending, by a pool user (PU) for making use of the service/s, a request to the name server (NS) indicating the pool name,
 - resolving, by the name server (NS) upon request, the pool name to a Name Resolution List, the Name Resolution List comprising address information, such as IP address, related to one or more of the pool elements (PE1, PE2),
 - sending the Name Resolution List by the name server (NS) to the pool user (PU),
 - accessing, by the pool user (PU) and based on the address information from the Name Resolution List, one of the pool elements (PE1, PE2) of the server pool (SP) for making use of the service/s,
- c h a r a c t e r i z e d b y
- sending status information related to the operational status of at least one of the pool elements (PE1, PE2) from the name server (NS) to the pool user (PU).
2. The method of claim 1,
- c h a r a c t e r i z e d i n t h a t
- the status information represents a timestamp indicating a point of time at which the status of one of the pool elements (PE1, PE2) is determined.

3. The method of claim 2,
c h a r a c t e r i z e d i n t h a t
the status of said one of the pool elements (PE1, PE2) is de-
termined based on a Keep-Alive-Acknowledgement-Message re-
5 c e i v e d b y t h e n a m e s e r v e r (N S) f r o m t h e o n e o f t h e p o o l e l e -
m e n t s (P E 1, P E 2) i n r e s p o n s e t o a K e e p - A l i v e - M e s s a g e s e n t b y
t h e n a m e s e r v e r (N S) t o t h e o n e o f t h e p o o l e l e m e n t s (P E 1,
P E 2) o r a l o c a l t i m e r e x p i r y n o t i f i c a t i o n a t t h e n a m e s e r v e r
(N S) d u e t o a m i s s i n g K e e p - A l i v e - A c k n o w l e d g e m e n t - M e s s a g e f r o m
10 o n e o f t h e p o o l e l e m e n t s (P E 1, P E 2),
t h e K e e p - A l i v e - A c k n o w l e d g e m e n t - M e s s a g e a n d t h e l o c a l t i m e r
e x p i r y n o t i f i c a t i o n i n d i c a t i n g t h e s t a t u s o f t h e o n e o f t h e
p o o l e l e m e n t s (P E 1, P E 2), f o r e x a m p l e a s b e i n g u p a n d d o w n,
r e s p e c t i v e l y.

15 4. The method of claim 2 or 3,
c h a r a c t e r i z e d i n t h a t
the status information comprises a positive number, for exam-
p l e r e p r e s e n t i n g t h e t i m e s t a m p, i f s a i d o n e o f t h e p o o l e l e -
20 m e n t s (P E 1, P E 2) i s i n a n u p - s t a t u s a n d
t h e s t a t u s i n f o r m a t i o n c o m p r i s e s a n e g a t i v e n u m b e r, f o r e x a m -
p l e r e p r e s e n t i n g t h e t i m e s t a m p w i t h a m i n u s s i g n, i f s a i d o n e
o f t h e p o o l e l e m e n t s (P E 1, P E 2) i s i n a d o w n - s t a t u s.

25 5. The method of any one of the preceding claims,
c h a r a c t e r i z e d i n t h a t
the sending of the request by the pool user (PU) to the name
s e r v e r (N S) i s p e r f o r m e d b y s e n d i n g a n a m e R e s o l u t i o n M e s -
s a g e, t h e s e n d i n g b e i n g t r i g g e r e d w i t h i n t h e p o o l u s e r (P U)
30 t o a c c o m p l i s h c a c h e p o p u l a t i o n.

6. The method of any one of the preceding claims,
c h a r a c t e r i z e d i n t h a t
s e n d i n g t h e n a m e R e s o l u t i o n L i s t b y t h e n a m e s e r v e r (N S) t o
35 t h e p o o l u s e r (P U) c o m p r i s e s s e n d i n g a n a m e R e s o l u t i o n R e -
s p o n s e M e s s a g e, w h i c h f u r t h e r c o m p r i s e s t h e s t a t u s i n f o r m a -

tion, whereby preferably the status information is inserted into the name Resolution Response Message as a status vector.

7. The method of any one of the preceding claims,

5 c h a r a c t e r i z e d i n t h a t

a particular one of the pool elements (PE1, PE2) in the server pool (SP) is selected for the server function, based on the status information in the status vector received from the name server (NS).

10

8. The method of any one of the preceding claims,

c h a r a c t e r i z e d i n t h a t

the pool user (PU) determines a status vector comprising status information related to an availability of one or more

15 of the pool elements (PE1, PE2) and

the status vector determined by the pool user (PU) is updated by the status vector received from the name server (NS).

9. The method of claim 8,

20 c h a r a c t e r i z e d i n t h a t

the status information related to the availability is determined by the expiry or non-expiry of one or more timers related to message transmission between the pool user (PU) and the one or more of the pool elements (PE1, PE2) in the application layer and/or transport layer.

25

10. The method of claim 8 or 9,

c h a r a c t e r i z e d i n t h a t

the status vector determined by the pool user (PU) is updated by replacing status information with corresponding status information of the status vector received from the name server (NS), in case the corresponding status information is indicated to be more up-to-date, for example the absolute value of a timestamp being higher.

30

11. The method of any one of claims 7 to 10,

c h a r a c t e r i z e d i n t h a t

in selecting a particular one of the pool elements (PE1, PE2) in the server pool, by the pool user (PU) further a server selection policy is applied, in particular Maximum Availability SSP or one of its extensions.

5

12. A name server (NS) for managing and maintaining a name space for a server pool (SP) with one or more pool elements (PE1, PE2) for providing a reliable server function in support of a service or a set of services, such as internet-

10

based applications, the name server comprising

- a pool resolution server module (10) to receive a request, preferably a name Resolution Message according to the IETF ASAP protocol, indicating the pool name, and

15

- a memory (14) to store address information, such as IP address, related to the pool elements (PE1, PE2) associated to a pool name identifying the server pool (SP),

the pool resolution server module (10) being adapted to resolve, in response to the request, the pool name to a name

Resolution List by accessing the memory (14) and extracting

20

the address information associated to the pool name thereof, and to assemble a message comprising the Name Resolution

List, such as a Name_Resolution_Response-Message according to the IETF ASAP protocol, and to send the message to the sender (16) of the request,

25

c h a r a c t e r i z e d i n t h a t

the memory (14) is further adapted to store status information associated to one or more of the pool elements (PE1, PE2) and

the pool resolution server module (10) is further adapted to

30

access, in response to the request, the memory (14) to extract the status information, and to send the status information back to the sender (16) of the request, preferably by inserting the status information into the message as a status vector.

35

13. The name server of claim 12,

c h a r a c t e r i z e d b y

an element status module (12) to assemble a Keep-Alive-Message, preferably an Endpoint_Keep_Alive-message according to the IETF ASAP Protocol, and to send the Keep-Alive-Message to one of the pool elements (PE1, PE2), and to receive a
5 Keep-Alive-Acknowledgement-Message or to receive a local timer expiry notification, preferably an Endpoint_Keep_Alive_Ack-message or a local timer expiry according to the IETF ASAP Protocol, from one of the pool elements (PE1, PE2) and, in response to this reception, to access the memory (14) to
10 write status information indicating the status of said one of the pool elements (PE1, PE2), preferably as being up and down, respectively.

14. The Name server of claim 13,
15 characterized in that the element status module (12) is adapted to write as the status information a number representing a timestamp.

15. A pool user device (PU) for making use of a server function in support of a service or set of services, for example internet-based applications, which can be provided by each one of one or more pool elements (PE1, PE2) of a server pool (SP), the pool user device comprising
20 - a pool resolution client module (16) to assemble a request, preferably a Name_Resolution-Message according to the IETF ASAP protocol, indicating a pool name identifying the server pool (SP), to send this request to a name server (NS) and to receive a message comprising a name resolution list, preferably a Name_Resolution_Response-Message according to the IETF
25 ASAP protocol from the name server (NS),
30 - a server selection module (18) to access, based on address information from the name resolution list, a particular one of the pool elements (PE1, PE2) of the server pool (SP) for making use of the service/s,
35 characterized in that the pool resolution client module (16) is further adapted to receive the message comprising a status vector and

the server selection module (18) is further adapted to access the particular one of the pool elements (PE1, PE2) in response to status information included in the status vector.

5 16. The pool user device of claim 15,
c h a r a c t e r i z e d b y
a memory (20) to store status information, preferably a
status vector, the pool resolution client module (16) and the
server selection module (18) being adapted to write and read,
10 respectively, the status information.

17. The pool user device of claim 16,
c h a r a c t e r i z e d b y
a server availability module (22) to determine status infor-
15 mation related to an availability of one or more of the pool
elements (PE1, PE2) and to access the memory (20) to write
the status information thereto.

18. The pool user device of claim 17,
20 c h a r a c t e r i z e d i n t h a t
the server selection module (18) is adapted to update the
status vector written by the server availability module (22)
to the memory (20) by the status vector received by the pool
resolution client module (16).

25 19. The pool user device of any one of claims 15 to 18,
c h a r a c t e r i z e d i n t h a t
in selecting a particular one of the pool elements (PE1, PE2)
in the server pool (SP), by the server selection module (18)
30 further a server selection policy is applied, in particular
Maximum Availability SSP or one of its extensions.